

## OCEAN GALES AND STORMS, 1938—Continued

Vessel	Voyage		Position at time of lowest barometer		Gale began September	Time of lowest barometer September—	Gale ended September	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN—Continued													
Sarcosie, Am. S. S.	Havre	Norfolk	50 50 N.	27 15 W.	21	3a, 22	23	29.03	S	WNW, 7	NW	NW, 9	W-NW.
Malvina, Du. M. S.	Rotterdam	Curacao	43 00 N.	20 30 W.	21	4a, 22	22	29.27	SW	SW, 8	WNW	SW, 10	SW-WNW.
Mopan, Br. S. S.	Liverpool	Kingston	48 00 N.	16 50 W.	22	7a, 22	22	28.95	WSW	SW, 7	W	W, 9	S-WSW.
Dinteldijk, Du. M. S.	London	London	50 43 N.	17 09 W.	22	7a, 22	22	28.63	SSW	SSE, 7	SSW	SSW, 9	SSE-SSW.
West Hobomac, Am. S. S.	Corpus Christi	Bremen	48 40 N.	15 30 W.	22	8a, 22	23	29.00	SE	SE, 10	SW	SE, 10	SE-S.
Azalea City, Am. S. S.	Antwerp	Georgetown, S. C.	44 36 N.	19 30 W.	22	11a, 22	22	29.49	SW	W, 8	W	SW, 10	SW-W.
Sundance, Am. S. S.	Savannah	London	48 54 N.	22 30 W.	22	Noon, 22	23	28.61	W	W, 10	W	WNW, 11	W-WNW.
Waban, Am. S. S.	New Orleans	Havre	49 34 N.	13 20 W.	22	Noon, 22	23	28.98	S	S, 11	SSW	SSE, 11	SSE-SSW.
Chesapeake, Br. M. S.	Oxelosund, Sweden	Baytown	52 50 N.	21 16 W.	22	3p, 22	23	28.58	NNW	NNW, 9	NW	NW, 10	NE-NW.
Collamer, Am. S. S.	Havre	New York	50 53 N.	18 08 W.	22	7p, 22	23	28.43	SSE	SW, 6	W	W, 10	SSW-W.
Lubratol, Belg. M. S.	Corpus Christi	Gothenburg	50 06 N.	18 36 W.	22	8p, 22	23	28.64	W	W, 10	WSW	W, 10	None.
American Merchant, Am. S. S.	New York	London	48 42 N.	21 00 W.	21	6a, 23	23	29.48	WSW	NW, 7	NW	NW, 9	None.
Mormacsun, Am. S. S.	Copenhagen	New York	57 50 N.	20 47 W.	22	8a, 23	23	28.75	ESE	N, 7	NW	NNW, 10	NE-NNW.
Frøde, Dan. S. S.	Gothenburg	Portland	56 43 N.	28 32 W.	27	2a, 27	28	29.41	W	WSW, 6	WNW	W, 10	SSE-WSW.
American Trader, Am. S. S.	London	New York	45 52 N.	41 42 W.	28	1a, 29	29	29.73	SE	SSW, 8	W	W, 10	S-WNW.
NORTH PACIFIC OCEAN													
Shoyo Maru, Jap. S. S.	Estero Bay, Calif.	Yokohama	43 58 N.	168 34 W.	31	Mdt. 31	1	29.38	SSE	S, 9	W	S, 9	SSE-W.
Granville, Pan. M. S.	Los Angeles	Manila	21 13 N.	144 05 E.	1	8p, 1	2	29.57	ESE	NNE, 4	N	N, 9	ENE-N.
St. Mihiel, U. S. A. T.	San Francisco	Balboa	15 33 N.	97 55 W.	5	3a, 5	5	29.31	N	NE, 8	WSW	NE, 9	NE-SE-WSW.
Kabuku, Am. S. S.	Los Angeles	do	17 13 N.	101 42 W.	6	1p, 6	6	29.70	E	E, 8	E	E, 8	ESE-NE-S.
Tweedbank, Br. M. S.	San Francisco	Manila	36 11 N.	163 22 W.	5	5a, 6	6	29.58	S	SW, 7	NW	SW, 10	S-W-SW.
Michigan, Am. S. S.	Los Angeles	Moskalevo	50 00 N.	155 00 E.	6	5a, 6	6	29.21	S	SW, 9	NW	NNW, 9	S-NW.
City of San Francisco, Am. S. S.	do	Acapulco	18 39 N.	104 39 W.	7	4p, 7	8	29.65	ESE	SE, 7	E	ESE, 10	SE-ESE.
Shikisan Maru, Jap. M. S.	Paramushiru	Los Angeles	47 53 N.	162 28 W.	7	1a, 7	9	29.17	WSW	WSW, 3	SE	SSE, 8	None.
Saparoa, Du. M. S.	Cebu, P. I.	Portland, Oreg.	46 24 N.	162 36 W.	8	1p, 8	8	29.27	W	WNW, 6	W	W, 9	None.
Washington, Am. S. S.	Los Angeles	Balboa	19 27 N.	105 55 W.	8	6p, 8	9	29.68	E	SE, 7	SE	SE, 7	NW-NNW.
Chirikof, Am. S. S.	Chignik, Alaska	Larsen Bay, Alaska	57 06 N.	155 30 W.	9	2a, 10	10	29.48	NNW	NNW, 8	NNW	NNW, 8	None.
Kallua, Am. S. S.	Port Allen, H. I.	San Francisco	37 00 N.	125 30 W.	10	4p, 11	11	29.87	NNE	NNW, 3	NNE	NNE, 8	None.
Washington, Am. S. S.	Los Angeles	Balboa	15 25 N.	97 25 W.	11	9a, 11	11	29.42	NNE	NE, 9	SW	S, 10	NNE-S.
Virginian, Am. S. S.	do	do	16 50 N.	99 04 W.	11	7p, 11	11	29.65	W	SW, 9	SSW	SW, 9	W-SW.
Daini Ogura Maru, Jap. M. S.	Yokohama	San Francisco	39 43 N.	151 12 W.	13	7p, 13	14	29.20	WNW	WNW, 7	NW	WNW, 8	WSW-NW.
Gefon, Nor. M. S.	do	Port San Luis	42 12 N.	148 54 W.	18	2p, 18	19	29.93	W	W, 8	W	W, 9	WSW-W.
Empress of Canada, Br. S. S.	Victoria, B. C.	Honolulu	42 26 N.	135 38 W.	18	2a, 19	19	29.46	S	S, 8	W	WSW, 8	S-WSW.
Nankai Maru, Jap. M. S.	Yokohama	San Francisco	43 53 N.	139 05 W.	18	6a, 19	19	28.94	SW	S, 8	WSW	S, 8	S-SW.
Hikawa Maru, Jap. M. S.	do	Vancouver, B. C.	49 05 N.	129 05 W.	19	6a, 19	19	29.46	SE	SE, 8	ESE	ESE, 8	SE-ESE.
Shoyo Maru, Jap. S. S.	do	Los Angeles	41 00 N.	160 00 W.	19	10a, 19	19	29.10	SE	SE, 11	S	SE, 11	SE-S.
Frank G. Drum, Am. S. S.	Los Angeles	San Jose, Guatemala	15 17 N.	96 32 W.	23	10p, 22	23	29.86	N	NE, 3	N	N, 7	None.
San Clemente Maru, Jap. M. S.	Yokohama	San Francisco	40 12 N.	151 50 E.	23	Mdt. 21	24	29.54	WNW	WNW, 5	NW	WNW, 9	SSE-WNW-W.
Golden Cloud, Am. S. S.	Balboa	Honolulu	17 52 N.	120 30 W.	24	1a, 25	25	29.66	NNE	W, 9	SW	W, 9	NW-WSW.
Pearleaf, Br. Navy	Singapore	Hong Kong	16 19 N.	113 18 E.	24	1a, 25	26	29.61	ENE	ENE, 8	ENE	ENE, 8	None.
China Arrow, Am. S. S.	Vladivostok	Los Angeles	45 07 N.	152 34 E.	25	8p, 25	27	29.24	ESE	SSE, 6	N	W, 8	SE-SW.
Do	do	do	49 40 N.	177 54 E.	30	8a, 30	31	29.43	ENE	N, 10	NW	NE, 10	NE-NNW.

<sup>1</sup> Barometer uncorrected.<sup>2</sup> Position approximate.<sup>3</sup> August.<sup>4</sup> October.

## NORTH PACIFIC OCEAN, SEPTEMBER 1938

By WILLIS E. HURD

**Atmospheric pressure.**—Pressure contrasts were abnormally developed for the month in the regions of the Aleutian low and the North Pacific high in September 1938. The low was central over the western waters of the Gulf of Alaska, with pressure at Kodiak, 29.59 inches (or 0.12 inch below the normal), the lowest of record for the month in the past 13 years. The high was central in midocean, with barometer at Midway Island, 30.12 inches (or 0.11 inch above the normal), the highest of record for the month since 1917. At Kodiak the average September fall in pressure from the mean barometer of August was 0.51 inch. The Aleutian low, therefore, is seen to have developed, especially for this early in the season, with unusual rapidity.

Except over the two "centers of action," the changes from normal pressure were small.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, September 1938, at selected stations

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Point Barrow	29.69	-0.21	30.04	3, 4, 5	29.20	16
Dutch Harbor	29.64	-.12	30.30	30	29.14	23, 24
St. Paul	29.71	-.00	30.20	30	29.18	23, 24
Kodiak	29.59	-.12	30.16	1	29.14	12
Juneau	29.89	-.03	30.14	13	29.40	20
Tatoosh Island	30.04	+.03	30.32	25	29.79	17
San Francisco	29.94	+.00	30.16	25	29.76	7
Mazatlan	29.84	+.02	29.98	24	29.70	7, 12
Honolulu	29.97	-.03	30.07	24	29.88	13
Midway Island	30.12	+.11	30.24	25	29.94	4, 5
Guam	29.78	-.05	29.86	26, 27	29.68	18, 19
Manila	29.74	-.03	29.83	13-16	29.56	30
Hong Kong	29.76	-.01	29.86	22	29.62	4
Naha	29.81	+.05	29.97	13	29.56	4
Titijima	29.82	-.04	30.00	26, 27	29.62	22

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

*Extratropical cyclones and gales.*—A few cyclones entered the northwestern part of the ocean from Asia, but the greater part of the extratropical cyclonic developments of the month occurred over northeastern waters concentrating between the vicinity of the Alaskan Peninsula and about the fortieth parallel to the southward.

To the westward of the one hundred eightieth meridian only one gale was reported prior to the 23d; that occurred on the 6th, southeast of Kamchatka. On the 23d and 26th, wind forces of 8 to 9 were experienced along those parts of the northern routes lying south of the Kuril Islands, and on the 30th a whole gale (force 10) was encountered south of the Aleutians.

In west longitudes there was a wider and more frequent distribution of storminess, with gales reported on 7 or 8 days within the area  $35^{\circ}$  to  $55^{\circ}$  N.,  $170^{\circ}$  W. and the American coast. Scattered fresh-to-strong gales occurred on the 1st, 8th, 11th, 13th, and 14th, and a whole gale on the 6th; but it was not until the 19th that storminess overspread a considerable region, extending from the Washington coast and Vancouver Island west-southward two-thirds of the way toward Midway Island. Over the eastern half of the area the gales reported on the 19th did not exceed force 8. The most intense wind of the day was a brief gale of force 11, encountered by the Japanese steamer *Shoyo Maru*, in  $41^{\circ}$  N.,  $160^{\circ}$  W. The ship's lowest barometer was 29.10. The lowest pressure occurring in an extratropical cyclone of the month was 28.56, reported by radio on the 19th by the British steamer *Eurypylus* from near  $50^{\circ}$  N.,  $140^{\circ}$  W.

Following the 19th there was very little storminess in northeastern waters.

*Tropical cyclones off the west coast of Mexico.*—A shallow depression appeared south of Cape Corrientes on September 1 and passed inland from the Gulf of California on the 3d. No gales were reported in connection with it.

The only cyclone of the month in this locality, the track of which can be drawn with some approximation, was that of the 4th to 13th. Wind and pressure conditions on the lower part of the Gulf of Tehuantepec late on the 4th were indicative of the formation of a Low. On the early morning of the 5th the U. S. A. T. *St. Mihiel*, southbound in the vicinity of  $15\frac{1}{2}^{\circ}$  N.,  $98^{\circ}$  W., ran into a succession of winds shifting over a period of about 2 hours from north, through northeast and southeast to southwest. The cyclone was of some intensity, with a maximum wind force of 9, accompanied by momentary stronger squalls, from northeast, lowest barometer 29.31. On the 6th cyclonic circulation was indicated specifically by a report from the American steamer *Kahuku*, but her lowest barometer was only 29.70, with strongest wind east, force 8, in  $17^{\circ}13'$  N.,  $101^{\circ}42'$  W., at about local noon.

The disturbance continued to move slowly northwestward, the center lying at about 100 miles from the coast between Acapulco and Manzanillo. The southbound steamer *City of San Francisco* was considerably under the influence of the cyclone from 8 a. m. of the 7th until 6 a. m. of the 8th, with strong southeasterly winds throughout, rising to force 10 during the afternoon of the 7th, lowest barometer 29.65. The highest winds reported thereafter in connection with the disturbance, as it moved slowly past Cape Corrientes and across the mouth of the Gulf of California, were of force 7. The cyclone persisted weakly until the 13th, when it disappeared at sea off the southern west coast of Lower California.

While the disturbance already described was in progress, another cyclone formed and dissipated suddenly on the 11th close off the coast between Salina Cruz and Acapulco. Its entire known history, at this writing, is em-

braced in the storm reports of the American steamers *Washington* and *Virginian*, both from Los Angeles toward Balboa. The *Washington* met gales shifting from northeast, force 9, at 9 a. m. (local time), to south, force 10, at 10 a. m., lowest barometer 29.42, in  $15^{\circ}25'$  N.,  $97^{\circ}25'$  W. The *Virginian* had a maximum wind of force 9 from the southwest at 7 p. m. of the 11th, in  $16^{\circ}50'$  N.,  $99^{\circ}04'$  W., lowest barometer 29.65.

On the afternoon of the 24th and continuing into the 25th, the American steamer *Golden Cross*, westbound, entered into a stormy region near  $18^{\circ}$  N.,  $120^{\circ}$  W. The gale began from the north-northeast, force 8, and ended from a westerly direction, highest force 9, lowest pressure, uncorrected, 29.66. A cyclone was evidently in progress to the westward of the Revillagigedo Islands.

A moderate north gale occurred in the Gulf of Tehuantepec on the morning of the 23d. Apparently it was a Tehautepecer—the first of the season.

*Typhoons and depressions of the Far East.*—There were several disturbances in tropical waters of the Far East during September. A complete discussion of them by the Rev. Bernard F. Doucette, S. J., of the Manila Observatory, is anticipated and will be published in a later REVIEW if not received in time for the current issue.

From our own meager reports it appears that a cyclone of some energy lay over the Marianas on September 1. The Panaman motorship *Granville* on that date had a north gale of force 9, lowest barometer 29.57, near  $21^{\circ}$  N.,  $144^{\circ}$  E. On the 4th a depression is shown on our maps east of the Nansei Islands. On the 5th it had moved to southern Japan, where it is indicated to have been of considerable depth and accompanied by strong gales. This was over the same region that had been hard hit by the disastrous typhoon of the night of August 31–September 1, mentioned in the preceding issue of the Review.

Late in the month another typhoon raged in the China Sea. Very early on the 25th the British Navy vessel *Pearleaf* reported an east-northeast gale of force 8, barometer 29.61, in  $16^{\circ}19'$  N.,  $113^{\circ}18'$  E. On the 26th to 28th a strong typhoon moved west toward the coast of Indo China, and thence northward into the Gulf of Tonking, where it appears to have been of great energy.

*Fog.*—Early autumn brought a lessening in fog production on the North Pacific, especially in higher middle latitudes, east of the one hundred and eightieth meridian, where it was unusually frequent in August and unusually scarce in September. The principal fog belt of the month lay along the western third of the northern steamer routes, with some 10 to 15 percent of days with fog. In United States coastal waters fog was reported off Washington on 4 days; off California on 6 days; and off Lower California on 2 days.

#### LATE REPORT: TYPHOONS AND DEPRESSIONS OVER THE FAR EAST, AUGUST 1938

By BERNARD F. DOUCETTE, S. J.

[Weather Bureau, Manila, P. I.]

*Typhoon, August 4–13, 1938.*—From August 4 to 8, a disturbance apparently of mild intensity moved in a west-northwesterly direction from the ocean regions about 300 miles south-southeast of the Bonins to the northern Nansei (Loochoo) Islands. Because of insufficient observations it was not certain that the storm had intensified to typhoon strength until it was in the Eastern Sea, about 250 miles east of Shanghai (August 9, 6 a. m.). It continued moving west-northwest into the continent, passing over the coast line about 80 miles north of Shanghai during the early morning hours of August 10. During the